MARBLE GRAVITRON

**MATERIALS**

* A marble
* A wine glass
* Your hand

###### **EXPERIMENT**

The Marble Gravitron

1. Begin by holding the glass upright. Grip the flat base of the wine glass with one hand and drop the marble in the top with the other.
2. Spin the glass to get the marble going around in a circle on the inside.
3. While still spinning the glass, tilt the glass so that it is on its side. The marble is staying in the glass!
4. Are you still spinning the marble in the glass? Good. Turn the glass upside down.
5. Were you expecting the marble to drop out the bottom of the glass? Did it?

Put the Marble in the Glass... Without Picking it Up!

1. Hold one of your hands flat with the palm facing up.
2. Place the marble in the middle of your palm and put the glass over the top of the marble.
3. Spin the glass like you did in the last experiment, getting the marble to spin against the inside of the glass.
4. Slowly tilt the glass so that it is right-side-up.
5. You've put the marble in the glass without even picking it up with your hand!

###### **HOW DOES IT WORK?**

The Marble Gravitron is a smaller version of what you can experience on the amusement park ride of the same name. The inertia of the spinning marble is a "push" force.  The glass supplies another "push" force that keeps the marble moving in a "uniform circular motion."  The force of the glass is centripetal force, a force that makes a body follow a curved path. The combined forces of the spinning marble and the glass create a relative force greater than gravity.  This is a small scale artificial gravity demonstration.

A real life application of this demonstration is how artificial gravity is created aboard a spacecraft.  In this instance, the rotating body is much larger (the spacecraft) and the spinning body (the astronaut) needs to go around much more slowly to recreate the feeling of gravity.  However, the same phenomenon is present as the astronaut is able to stand upright against the outside of the spacecraft. Can you think of any other real-life scenarios where this is used?